



FLWEMS Paramedic Medication Information For:

MAGNESIUM SULFATE

(mag-NEE-see-um SUL-fayt)

Pregnancy Category: A Epsom Salts (OTC and Rx)

Classification

Anticonvulsant, electrolyte, saline laxative

See Also: See also *Anticonvulsants* and *Laxatives*.

Action/Kinetics

Magnesium is an essential element for muscle contraction, certain enzyme systems, and nerve transmission. Extracellular fluid levels: 1.5-2.5 mEq/L. Mg depresses the CNS and controls convulsions by blocking release of acetylcholine at the myoneural junction. Also, Mg decreases the sensitivity of the motor end plate to acetylcholine and decreases the excitability of the motor membrane. Therapeutic serum levels: 4-6 mEq/L (normal Mg levels: 1.5-3.0 mEq/L). Onset: IM, 1 hr; IV, immediate. Duration: IM, 3-4 hr; IV, 30 min. Excreted by the kidneys.

Uses

Seizures associated with toxemia of pregnancy, epilepsy, or when abnormally low levels of magnesium may be a contributing factor in convulsions, such as in hypothyroidism or glomerulonephritis. For eclampsia, IV use is restricted to control of life-threatening seizures. Acute nephritis in children to control hypertension, encephalopathy, and seizures. Replacement therapy in magnesium deficiency. Adjunct in TPN. Laxative. *Investigational:* Inhibit premature labor (not a first-line agent). IV use as an adjunct to treat acute exacerbations of moderate to severe asthma in clients who respond poorly to beta agonists. IV use to reduce early mortality in clients with acute MI (is given as soon as possible and continued for 24-48 hr).

Contraindications

In the presence of heart block or myocardial damage. In toxemia of pregnancy during the 2 hr prior to delivery.

Special Concerns

Use with caution in clients with renal disease because magnesium is removed from the body solely by the kidneys.

Side Effects

Magnesium intoxication. *CNS:* Depression. *CV:* Flushing, hypotension, *circulatory collapse, depression of the myocardium.* *Other:* Sweating, hypothermia, muscle paralysis, CNS depression, *respiratory paralysis.* Suppression of knee jerk reflex can be used to determine toxicity. *Respiratory failure may occur if given after knee jerk reflex disappears.* Hypocalcemia with signs of tetany secondary to magnesium sulfate when used for eclampsia.

Overdose Management

Symptoms: Serum levels can predict symptoms of toxicity. Symptoms include *sharp decrease in BP and respiratory paralysis* changes in ECG (increased PR interval, increased QRS complex, prolonged QT interval), *asystole, heart block.* At serum levels of 7-10 mEq/L there is hypotension, narcosis, and loss of DTRs. *Levels of 12-15 mEq/L result in respiratory paralysis; greater than 15 mEq/L cause cardiac conduction problems. Levels greater than 25 mEq/L cause cardiac arrest.* *Treatment:* Use artificial ventilation immediately. Have 5-10 mEq of calcium (e.g., 10-20 mL of 10% calcium gluconate) readily available for IV injection to reverse heart block and respiratory depression. Hemodialysis and peritoneal dialysis are effective.

Drug Interactions

CNS depressants (general anesthetics, sedative-hypnotics, narcotics) / Additive CNS depression Digitalis / Heart block when Mg intoxication is treated with calcium in digitalized clients Neuromuscular blocking agents / Possible additive neuromuscular blockade

How Supplied

Injection: 40 mg/mL, 80 mg/mL, 100 mg/mL, 125 mg/mL, 500 mg/mL

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Dosage

•**IM Anticonvulsant.**

Adults: 1-5 g of a 25%-50% solution up to 6 times/day. Pediatric: 20-40 mg/kg using the 20% solution (may be repeated if necessary).

•**IV Anticonvulsant.**

Adults: 1-4 g using 10%-20% solution, not to exceed 1.5 mL/min of the 10% solution.

Hypomagnesemia, mild.

Adults: 1 g as a 50% solution q 6 hr for 4 times (or total of 32.5 mEq/24 hr).

Hypomagnesemia, severe.

Adults: Up to 2 mEq/kg over 4 hr.

•**IV Infusion Anticonvulsant.**

Adults: 4-5 g in 250 mL 5% dextrose at a rate not to exceed 3 mL/min.

Hypomagnesemia, severe.

Adults: 5 g (40 mEq) in 1,000 mL dextrose 5% or sodium chloride solution by slow infusion over period of 3 hr.

Hyperalimentation.

Adults: 8-24 mEq/day; infants: 2-10 mEq/day.

•**Oral Solution Laxative.**

Adults: 10-15 g; pediatric: 5-10 g.

END OF INFORMATION – NOTHING FOLLOWS